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ABSTRACT

This study investigated the learning style preferences of Taiwanese junior college students of English-as-a-Second-Language (ESL) and student characteristics, language experience, and attitudes that appeared related to learning style preference. Subjects were approximately 1,000 EFL students in the first through third years of study at seven junior colleges. A questionnaire based on four learning style preferences (auditory, visual, kinesthetic/tactile, group/individual) was administered. Results indicate that female students expressed more willingness to adopt more learning styles than males, and showed higher willingness to learn, learning achievement, and better teacher-student relationships. Second-year students had a better self-concept and teacher student relationship than did third-year students. Learning willingness, achievement, and self-concept correlated better with earlier English language learning. Most students, even low achievers, had a good relationship with the teacher. The questionnaire, in Chinese, and response data analyses, in English, are appended. Contains 37 references. (MSE)

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Perceptual Learning Style Preferences for EFL Students in Junior Colleges in Taiwan

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Abstract

This paper attempts to address what current EFL college students' preferred learning styles are and the variables which influence the learners' learning styles, such as gender, year level, beginning time, and the period of learning time. Besides, the relationship between learners' learning styles and their learning willingness, self-concept, learning achievement, and teacher-student relationships are discussed respectively.

About 1,000 EFL Junior College students from the first through the third year from seven schools in the Tainan area completed the questionnaire which was designed on the basis of Prof. Reid's " Perceptual learning style preference questionnaire" by the researchers. The survey consisted of four randomly arranged learning style preferences: auditory, visual, kinesthetic/tactile and group/individual learning. In addition, the teachers' teaching styles were surveyed from the students' points of view.

Female learners expressed a significantly greater preference for various learning styles than male learners. No specific learning style preference was found among the different year level students. Students who learned English from Elementary school demonstrated higher learning willingness, learning achievement and self-concept than those who started at Junior High school. The implications for English teaching and learning are discussed.

Introduction

In Taiwan, English is currently taught by using a great deal of grammatical rules and structures with emphasis on rote-learning. Isolated sentences are commonly extracted from a text and then used to illustrate various grammatical rules which learners are required to memorize. As a result, learners "master" the language by mechanically reci ing and memorizing the grammar. The Chinese believe that discipline is an important factor which leads to a creative and successful use of language. For them, it is held that "orginality can emerge through bounds of discipline". Once disciplines become mastered and internalized, when the Chinese learn to express their ideas, they will employ styles that are considered to be proper and for which others have received favorable recognition (Anderson 1993; Scovel ,983). It is not surprising, then, that they carry this learning style over into the memorizing of twenty six alphabetical letters and the grammatical rules of English.

The belief in the usefulness of rote memorization is further reinforced by the main function of English in Taiwan. In Taiwan English is used to pass the entrance examinations of well-known senior high schools, colleges, and universities. The content and objectives of English teaching are geared toward passing the exams. Teachers routinely give the same lectures and tests, and assign the same papers and projects to their students without regard for their students' individual learning abilities and preferences(Ault, 1986). However, students who prefer to engage in other activities may be given a low rating by a professor who teaches by lecture (Kolb, 1984) . Students who fail to do well in class may have been laughed at in front of the class or scolded by the teachers. Students lose self-esteem in class and refuse to learn any more.

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Learning styles theory about how people learn has been known for at least 25 years. Yet, for the most part, college teachers still dispense information in the traditional lecture/exam method without regard for the differing learning styles of their students (Ault, 1986). However, College teaching and learning as an activity is undoubtedly one of the most complex in which human beings are purposefully engaged (Hunter, 1979). College teachers find themselves challenged to deal with adolescents in order to handle situations in different ways, and develop different learning preferences for students in terms of how they grasp experience and transform it (Claxton & Murrell, 1987). It is now time for college teachers to accept the challenges of individual differences (Gregore, 1979). Continuing to use ineffective teaching methods will increasingly be counterproductive to students and to instititions as well (Ault, 1986).

Learning style is commonly described as " cognitive, affective, and physiological traits that are relatively stable indicators of how learners perceive, interact with and respond to the learning environment " (Keefe, 1979).

In the mid-to-late 1970's, learning styles were identified as "a quality that persists though the content may changed" (Fischer & Fischer, 1979). In order to determine the various learning styles, public school students were asked to complete a self-reporting questionnaire to identify their learning styles (Babich, Burdine, Allbright, and Randol, 1975; Dunn, Dunn & Price, 1975). Most students identified their learning styles correctly. Dunn (1983) and Dunn and Dunn (1979) reported on perceptual learning styles which described how learners understand, organize and retain experiences. 20%-30 % of elememtary school students tend to be auditory learners, 40% are visual and 30% -40% are tactile/kinesthetic, visual/tactile, or some other combination. Two researchers (Dunn, 1983, 1984; Reinert, 1976) have claimed four basic learners' perceptual learning modalities:

1. Visual learning: reading, studying charts
2. Auditory learning: listening to lectures, audiotapes
3. Kinesthetic learning: experiential learning, that is, total physical involvement with a learning happening
4. Tactile learning: "hands-on" learning such as building models or doing laboratory experiments.

Much research in learning style has been done with students whose native language is English (Cavanaugh, 1981; Hodges, 1982; Stewart, 1981) and with students who learn English as a second language in the United States (Ballinger & Ballinger, 1982; Birckbichler & Omaggio, 1978; Hosenfeld, 1979; Ramirez, 1986; Wong Fillmore, 1976). Reid (1983; 1984) has found that ESL students preferred kinesthetic and tactile learning styles most, while group learning had a negative preference for most groups.

However, there is no published research that describes the perceptual learning styles preferences of nonnative English speakers (Reid, 1987). Research of ESL students' learning styles is needed.

Besides, the issue of matching versus mismatching of preferred ways of learning has been the subject of considerable writing and debate, (Claxton & Murrell, 1988). In Domino's Study (1979), it was found that college students taught in their preferred learning styles scored higher on tests, attitudes, and factual knowledge than those who were taught in styles different from their preferred styles. Kolb (1984) claimed that matching students' and teachers' learning styles could improve students' performance in class. In addition, research with secondary students (Hodges, 1982) has shown that about 90% of traditional class instruction is designed toward the "auditory" learners. Only 20% to 30% of students could remember 75% of what was taught through discussion.

In order to diminish poor learning achievement, some learning style theorists have suggested matching teachers' and students' styles (Barbe, Swassing, & Milone,1979, Dunn,1984, Dunn & Dunn, 1979, Dunn, Dunn, & Price 1978, Gregore 1979, Hunt 1979). However, Waugh (1971) found that auditory style children did not perform better on an auditorially presented recall test, and neither did the visual type children. Davis, Jane Furr, and others (1988) indicated that there were no significant differences in course grade according to whether students' learning styles were matched , not matched, or partially matched with their teachers'.

Goals

This paper attempts to address what current college learners' favorable learning styles are ; the importance of learning styles ; the variables which influence the learners' learning styles, such as gender, year level, beginning time, and the period of learning time. Besides, the relationship between learners'learning styles and their learning willingness, self-concept, learning achievement; and teacher-student relationships are discussed respectively.

Method

1050 Junior college students from the first year through the third year from seven schools in Tainan area completed the questionnaire.Questionnaires were mailed to the seven Junior Colleges in Tainan. From each school, three class students (about fifty students in each class) were randomly chosen from three different year levels to complete the questionnaire. Nine hundred and forty seven questionnaires were sent back to the researchers and there were nine hundred and nineteen valid ones. The rate of return was about ninety percent.

INSERT TABLE 1-3 HERE

The questionnaire was designed by the researchers on the basis of Prof. Reid 's " Perceptual learning style preference questionnaire" and current learning styles commonly used by Junior College students, that is, individual and group learning. Thus,
The questionnaire consisted of 44 items within four randomly arranged learning style preferences : auditory, visual, kinesthetic/ tactile and group/individual learning, (items 1 to 39) (see appendix). In addition, the teachers' teaching styles and revelant variables were surveyed from the students' points of view (items 26 to 44). Responses were obtained on a five point scale (1) strongly disagree (2) disagree (3) no opinion (4) agree (5) strongly agree. Scores were ranked from 1 to 5, with the higher score indicating higher agreement with the statement. Reliability of the questionnaire of Students' learning style preferences done by Cronbach α was .70 and by the Split- half method was .71. Reliability of teachers' teaching style preferences done by Cronbach α was .71 and by the Split- half method was .71. Statistical analyses were done by t-test, x2-test, one way anova, and Pearson correlation coefficient using spss. pc+ software.

Results

Beginning time

The results of this study showed that most students' beginning time for English learning was Junior High school (66.3%). The figure for Elementary school was 23.8%, and for kindergarten and other time , 9.9%.

INSERT TABLE 4 HERE

Learning styles
Students from all three year levels ranked different preferred learning styles from kinesthetic/ tactile (mean=3.535), group(mean=3.505), visual (mean=3.183), then audio (mean=3.128). No specific learning style was preferred by any particular year level.

Learning styles and gender
There is a significant difference between male and female students employing various learning styles. Females tends to be more open and willing to learn through different ways. (t=-4.22,p=.000; t=-5.95 , p=.000, t=-3.94, p=.000; and t= -3.85, p= .000)

INSERT TABLE 5 HERE

Learning styles, year level, and length of time learning English
Students showed significantly different preferences in their audio and kinesthetic learning styles according to the different length of time they had studied English.

INSERT TABLE 6 HERE

(F=2.4068, p=.0144; F- 2.6952, P= .0063), However, no specific two different learning year students showed significant difference at the .050 level.
Students of different year levels demonstrated no significantly different preferences in any learning styles and showed an open attitude to all of the four learning styles.

INSERT TABLE 7 HERE

In addition, for teachers, there is a high correlation between the teaching styles and the teaching style preferences. Teachers used multiple teaching styles in teaching instead of only one teaching method..

INSERT TABLE 8 HERE

Relationship between gender, year level ; and beginning time and the others
Females tends to obtain higher scores from the questionnaire on their learning willingness, self-concept and teacher-student relationship than the male students.

INSERT TABLE 9 HERE

Students of different year levels demonstrated various attitudes toward their self-concept and teacher-student relationship. On Scheff's test, the third year students had significantly

lower self-concept than the other year level students. Besides, the second year students showed the strongest teacher-student relationship in comparison with the other two levels.

INSERT TABLE 10 HERE

Students of different beginning time to learn English had significantly different learning willingness, learning achievement and self-concept. On Scheffe's test, students who started to learn English at Elementary school demonstrated higher learning willingness, learning achievement and self-concept than those who started at Junior high school..

INSERT TABLE 11 HERE

Matching students' learning styles with teachers' teaching style
Students who prefer audio and kinesthetic/tactile learning style matching their teacher's showed significantly higher correlation in their learning willingness and teacher-student relationship.

INSERT TABLE 12 &13 HERE

Students who prefer visual learning style matching their teacher's showed a significantly higher correlation in their learning willingness, self-concept and teacher-student relationship.

INSERT TABLE 14 HERE

In addition, there is a positive correlation between teachers who adopt visual teaching and students who prefer group learning.

INSERT TABLE 15 HERE

Discussion

Learning Styles

Most college students employ multiple learning styles in class. No learning preferences have been found which are specific to any of the three grades. Previous research indicated that learners who are able to use multiple learning styles achieve greater success in class (Cronbach & Snow, 1977; Stewart 1981). Another way to explain this result is that " Students' learn intuitively to adjust to the instructor's cognitive styles" (Fourier, 1984). In this study teachers tended to use various ways to teach though they still spent a lot of time on grammatical structure and sentence translation which made students' learning styles malleable.

Gender differences

Overall female students exhibited more willingness to adopt more learning styles than males and showed higher learning willlingness, learning achievement , and better teacher-

student relationships. This was true of an earlier study with Australian students (Zammit,1992,1993). Methods to arouse and encourage male students to devote themselves to language learning need further investigation. As most EFL teachers are females, other issues requiring more research are the appropriateness of study materials, the designing of learning activities, the process of class instructions and task achievement for male students.

Year Level

The year level of the students in this study has an interesting finding. Second year students have a better self concept and better teacher-student relationship than the third year students, as do the first year students. However there are no significant differences between the students on learning willingness and learning achievement. The reasons behind the differences were not relevant
to the research findings. These results suggest three questions: are EFL teachers in Junior Colleges spending much time encouraging students to learn, and building stronger teacher-student relationships than those in Junior High Schools who spend much time on pushing and testing students' learning outcomes? Are college EFL teachers neglecting students' learning goals while providing a harmonious, interesting learning environment? Are students more socially oriented than task oriented? Besides, no correlation has been found between specific learning style and each year level.

Beginning time and length of time learning English

There is a strong positive correlation between English learners who started at Elementaty school and their learning willingness, learning achievement, and self-concept. As we know, children English courses are more learner oriented. Students are taught under a free, relaxed and interesting atmosphere when compared with the Junior or College students who are busy preparing exams or writing homework. It goes without saying that those students who started to learn English at Elementary school would have higher learning motivation, learning achievement and self-concept. It is hoped that current Junior High School authorities may need to take consideration of the pros and cons of English teaching which may give students too much pressure and exams and deprive them of the happiness of learning.

Matching Students' learning styles with teachers' styles

The result supports Waugh's (1971) and Davis, Jane Furr's study
(1988) which indicated that students whose learning styles matched the teachers' did not show better performance on learning than those who were not matched. Nevertheless, the study result shows that there is a positive correlation of the matched learning styles and learners' learning willingness, self-concept and teacher-student relationship. Further research is needed to identify the relationship. In addition, students whose learning strength is visual demonstrate positive correlation with group learning style. Cooperative learning style is recommended to enhance this kind of learning style instead of traditional lecture/exam teaching.

Teacher-students relationship

Based on the assessment result, most students have a good relationship with EFL teachers,in spite of their low academic performance. There are several possible reasons for this occurrence. First, college teachers pay more attention to build the relationship with students though most of the time they still use traditional ways, lecture/exam in class.

Second, at college level, teachers and students do not have the pressure of passing entrance exams which deny them the time to contribute to other learning activities. The third consideration of the result is the teachers' professional training background. Most of the EFL teachers at college level have graduated from overseas which may provide a more open and respected learning atmosphere for students resulting in better teacher-student relationships.

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英文學習模式喜好問卷表

學校名稱_____ 科別_____ 年級_____

性別：□ 男 □ 女 年齡(實歲)_____ 日期_____

開始學英文時間：(1.幼稚園 2.小學 3.國中 4.其他_____(請說明))

學習英語時間：_____年

說明：本問卷是用來了解同學目前學習英文的各種方法，題中的"老師"係指英文老師，題中的"課堂"意指英文課。問卷採不記名方式作答，答案也無對錯之分，請同學據實回答，並在意見欄中，標明你的答案。譬如：如果你十分同意，即表示在非常同意欄中畫上" ✔ "；若不同意，則在不同意欄中畫" ✔ "。

例如：

□	□	□	□	☑
非常不同意	不同意	沒意見	同意	非常同意

作答時，請勿花太多時間思考問題，迅速回答每一個問題，當決定答案後，請用原子筆作答。

	非常不同意	不同意	沒意見	同意	非常同意
1. 我比較喜歡在課堂中藉由話劇表演、演講比賽等活動來學習英文	□	□	□	□	□
2. 老師如果將上課內容寫在黑板上，對我的學習會有很大的幫助。	□	□	□	□	□
3. 如果只有聽講，老師沒寫黑板，我會有很多地方不明白。	□	□	□	□	□
4. 我比較喜歡藉由身體的實際動作來學英文，例如，老師教到pick up the newspaper, go get a cup of coffee 時，叫我們用動作來表示。	□	□	□	□	□
5. 我比較記得課堂上老師講的部份，而不是書本中的閱讀部份。	□	□	□	□	□
6. 當我自己閱讀教材時，比我聽老師講課更能明白。	□	□	□	□	□
7. 當我有機會製作課堂內使用的相關教材時，我的學習效果會比只是上課聽講來的好。	□	□	□	□	□
8. 當我自己一個人讀書時，我可以讀得很好。	□	□	□	□	□
9. 當老師在課堂內作口頭講解時，我可以學得比較好。	□	□	□	□	□
10. 當我一個人單獨用功時，比和一群同學一起讀，效果更好。	□	□	□	□	□
11. 在課堂中如果有機會和同學一起作英文學習活動，我比較能了解上課內容。	□	□	□	□	□
12. 我喜歡和同學一起作老師指定的功課。	□	□	□	□	□
13. 當我讀英文時，我習慣一邊讀，一邊將讀的內容寫下來，例如：背單字時，我會一邊背，一邊寫單字。	□	□	□	□	□

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	非常不同意	不同意	沒意見	同意	非常同意
14. 我上課時只喜歡聽別人講（包括老師和同學）。	□	□	□	□	□
15. 就閱讀教材與課堂聽講二種學習方式比較，我覺得前者比較好。	□	□	□	□	□
16. 當我閱讀文章時，文中的景象會一一浮現在腦海中。	□	□	□	□	□
17. 當我可以參與和學習內容相關的活動時，我的學習效果最好。	□	□	□	□	□
18. 我讀英文時，習慣唸出來。	□	□	□	□	□
19. 我比較喜歡自己一個人進行讀書計畫，而不是和同學一起。	□	□	□	□	□
20. 我覺得聆聽與課文內容有關的錄音帶，比只是閱讀課文的學習效果來得好。	□	□	□	□	□
21. 我喜歡抄黑板或寫筆記，這樣有助於我學英文的效果。	□	□	□	□	□
22. 當老師要求小組報告而不是個人報告時，我很喜歡和小組一起工作。	□	□	□	□	□
23. 在目前的英文課中，我感到很無趣，很想蹺課。	□	□	□	□	□
24. 這學期中，我的英文成績總是不及格。	□	□	□	□	□
25. 我認為影響我學習英文的重要因素之一是：老師的教法。	□	□	□	□	□
26. 老師上課時，往往是一直講課。	□	□	□	□	□
27. 老師上課時，時常寫黑板幫助我們了解。	□	□	□	□	□
28. 老師常常將同學分組做討論或活動。	□	□	□	□	□
29. 老師時常給我們考試，並且花很多時間在中文翻譯和文法結構上	□	□	□	□	□
30. 老師時常播放和上課內容有關的影片給我們看。	□	□	□	□	□
31. 老師時常讓我們聽和上課內容有關的錄音帶。	□	□	□	□	□
32. 老師常常帶我們做活動或表演所學內容。	□	□	□	□	□
33. 老師上課很少叫我們說英文。	□	□	□	□	□
34. 在課堂外遇見老師，我會覺得很尷尬。	□	□	□	□	□
35. 老師上課時給我的回應，時常讓我覺得我是個英文的失敗者。	□	□	□	□	□
36. 如果老師時常鼓勵我，我的英文應該會有進步。	□	□	□	□	□
37. 老師上課時，會針對我們的學習困難，而以不同的方法教導我們	□	□	□	□	□
38. 上英文課時，我覺得自己笨手笨腳的，什麼都不會忘，也不會回答問題。	□	□	□	□	□
39. 在學習英文方面，我覺得很受挫折，很沒有成就感。	□	□	□	□	□
40. 我在課堂外遇見老師時，會很高興地和老師打招呼。	□	□	□	□	□
41. 上完英文課後，我常常覺得自己很有語言天份。	□	□	□	□	□
42. 我時常利用課餘時間收聽英語教學節目。	□	□	□	□	□
43. 我會主動觀賞英語影片。	□	□	□	□	□
44. 我會利用寒暑假或課餘時間，參加校外的英語課程。	□	□	□	□	□

Table 1.

College	Population	%	Male(%)	Female(%)	Missing(%)
遠東工專	138	15.0	97(70.3)	35(25.4)	6(4.3)
南台工商專	121	13.2	103(85.1)	15(12.4)	3(2.5)
嘉南藥專	137	14.9	47(34.3)	86(62.8)	4(2.9)
崑山工專	128	13.9	105(82.0)	18(14.1)	5(3.9)
南榮工專	133	14.5	79(59.4)	48(36.1)	6(4.5)
台南家專	123	13.4	0(0.0)	123(100.0)	0(0.0)
中華醫專	139	15.1	13(9.4)	122(87.8)	4(2.9)
合　計	919	100.0	444(48.3)	447(48.6)	28(3.0)

Table 2.

Year level	N	%
1	311	33.8
2	294	32.0
3	313	34.1
Missing	1	0.1
TOTAL	919	100.0

Table 3.

Gender	N	%
Male	444	48.3
Female	447	48.6
Missing	28	3.0
TOTAL	919	100.0

Table 4.

Beginning time	N	%
Kindergarten	7	0.8
Elementary school	219	23.8
Junior high school	609	66.3
Other	12	1.3
Missing	72	7.8
TOTAL	919	100.0

Table 5. **T-test of Gender with Each Learning Style**

Learning style	Gender	N	Mean	t-value	p-value
Audio	M	423	3.0658	-4.22	.000***
	F	426	3.1862		
Visual	M	435	3.0846	-5.95	.000***
	F	427	3.2768		
Kinesthetic (Tactile)	M	435	3.4625	-3.94	.000***
	F	433	3.6157		
Individual	M	436	3.1384	-.96	.338
	F	435	3.1900		
Group	M	432	3.4252	-3.85	.000***
	F	432	3.5934		

* α=0.05 ** α=0.01 *** α=0.001

Table 6. **One-way ANOVA of Years with Each Learning Style**

Learning style	Years	N	Mean	F-value	p-value	Multiple Range Test (Scheffe)
Audio	4	177	3.0706	2.4068	.0144*	No two groups are significantly different at the .050 level
	5	220	3.1280			
	6	240	3.1431			
	7	83	3.1627			
	8	21	3.4365			
	9	32	3.0677			
	10	7	3.3571			
	11	2	2.9167			
	12	1	3.3333			
Kinesthetic (Tactile)	4	176	3.4318	2.6952	.0063**	No two groups are significantly different at the .050 level
	5	220	3.5264			
	6	251	3.6127			
	7	83	3.5952			
	8	22	3.7273			
	9	31	3.4452			
	10	7	3.8286			
	11	2	4.4000			
	12	2	3.1000			

* α=0.05 ** α=0.01

Table 7. **One-way ANOVA of Year Level with Each Learning Style**

Learning style	Year Level	N	Mean	F-value	p-value
Audio	1	302	3.0861	2.9980	.0504
	2	281	3.1257		
	3	293	3.1701		
Visual	1	301	3.1522	1.0349	.3557
	2	285	3.1860		
	3	301	3.2086		
Kinesthetic (Tactile)	1	302	3.4841	2.7117	.0670
	2	285	3.5256		
	3	307	3.5922		
Individual	1	305	3.1628	.6281	.5339
	2	287	3.2137		
	3	306	3.1427		
Group	1	305	3.4951	.1177	.8890
	2	283	3.4959		
	3	302	3.5177		

Table 8. **Pearson Correlation Coefficients between Each Learning Style & Teaching Style**

Students'	Audio	Visual	Kinesthetic (Tactile)	Individual	Group
Audio	1.0000	.2135**	.2981**	.1497**	.1753**
Visual		1.0000	.2850**	.2640**	.1682**
Kinesthetic (Tactile)			1.0000	.0309	.4513**
Individual				1.0000	-.1280**
Group					1.0000

Teachers'	TA	TV	TK(TT)
TA	1.0000	.2189**	.2887**
TV		1.0000	.4870**
TK(TT)			1.0000

* α=0.01 ** α=0.001

TA means teachers who use auditory teaching style
TV means teachers who use visual teaching style
TK means teachers who use kinesthetic teaching style
TT means teachers who use tactile teaching style

Table 9. **T-test of Gender with Learning Willingness, Learning Achievement, Self-Concept, and Teacher-Student Relationship**

	Gender	N	Mean	t-value	p-value
Learning willingness	M	442	2.7206	-3.43	.001***
	F	441	2.8861		
Learning achievement	M	432	3.3873	-3.17	.002**
	F	442	3.5452		
Self - concept	M	438	2.9840	.02	.982
	F	443	2.9827		
Teacher - student relationship	M	440	3.4841	-4.62	.000***
	F	440	3.6727		

* α=0.05 ** α=0.01 *** α=0.001

Table 10. **ANOVA of Year Level with Learning Willingness, Learning Achievement, Self-Concept, and Teacher-Student Relationship**

	Year level	N	Mean	F-value	p-value	Multiple range test (Scheffe')
Learning willingness	1	310	2.7774	.3117	.7323	No two groups are significantly different at the .050 level
	2	289	2.8123			
	3	272	2.8208			
Learning achievement	1	303	3.4455	1.7701	.1709	No two groups are significantly different at the .050 level
	2	288	3.5451			
	3	274	3.4453			
Self - concept	1	305	3.0415	5.9548	.0027**	1 > 3
	2	289	3.0854			2 > 3
	3	274	2.8540			
Teacher - student relationship	1	309	3.4876	9.4149	.0001***	2 > 1
	2	287	3.6992			2 > 3
	3	272	3.5478			

* α=0.05 ** α=0.01 *** α=0.001

Table 11. **One-way ANOVA of Beginning Time with Learning Willingness, Learning Achievement, Self-concept, and Teacher-Student Relationship**

	Beginning time	N	Mean	F-value	p-value	Multiple range test (Scheffe)
Learning willingness	Kindergarten	7	3.0357	5.3264	.0012**	Elementary school > Junior high school
	Elementary school	215	2.9535			
	Junior high school	604	2.7314			
	Other	12	2.7292			
Learning achievement	Kindergarten	7	3.3810	9.0025	.0000***	Elementary school > Junior high school
	Elementary school	215	3.6930			
	Junior high school	598	3.4008			
	Other	12	3.2500			
Self - concept	Kindergarten	7	3.3333	10.3292	.0000***	Elementary school > Junior high school
	Elementary school	216	3.2546			
	Junior high school	601	2.9035			
	Other	12	2.5833			
Teacher - student relationship	Kindergarten	7	3.2857	2.2921	.0768	No two groups are significantly different at the .050 level
	Elementary school	214	3.6651			
	Junior high school	603	3.5522			
	Other	12	3.5833			

* α=0.05 ** α=0.01 *** α=0.001

Table 12. **Influence on Students' Learning Styles Matching Their Teachers' Teaching Styles**

	Audio	N	Mean	t-value	p-value
Learning willingness	Match	213	2.8920	-2.14	.032*
	Unmatched	697	2.7708		
Learning achievement	Match	211	3.4992	-.64	.522
	Unmatched	691	3.4621		
Self - concept	Match	213	2.9593	.55	.581
	Unmatched	694	2.9962		
Teacher - student relationship	Match	212	3.6698	-2.55	.011*
	Unmatched	695	3.5498		

* α=0.05

Table 13. **Influence on Students' Learning Styles Matching Their Teachers' Teaching Styles**

	Kinesthetic (Tactile)	N	Mean	t-value	p-value
Learning willingness	Matched	125	3.0720	-4.59	.000***
	Unmatched	785	2.7557		
Learning achievement	Matched	125	3.4693	.02	.981
	Unmatched	777	3.4710		
Self - concept	Matched	128	3.0885	-1.45	.148
	Unmatched	779	2.9709		
Teacher - student relationship	Matched	127	3.7060	-2.59	.010*
	Unmatched	780	3.5556		

* α=0.05 ** α=0.01 *** α=0.001

Table 14. **Influence on Students' Learning Styles Matching Their Teachers' Teaching Styles**

	Visual	N	Mean	t-value	p-value
Learning willingness	Matched	215	3.0651	-6.30	.000***
	Unmatched	695	2.7169		
Learning achievement	Matched	213	3.5430	-1.64	.101
	Unmatched	689	3.4485		
Self - concept	Matched	216	3.0941	-2.11	.035*
	Unmatched	691	2.9542		
Teacher - student relationship	Matched	215	3.7349	-4.40	.000***
	Unmatched	692	3.5275		

* α=0.05 ** α=0.01 *** α=0.001

Table 15. **Pearson Correlation Coefficients between Each Learning Style**

	TA	TV	TK(TT)
Audio	.0801	.0734	.0396
Visual	.0480	.0567	.0356
Kinesthetic (Tactile)	.0814	.0907	.0650
Group	.0661	.1175**	.0666

* α=0.01 ** α=0.001